

Program Abstracts

Plenary Session, Thursday, 9:00 am – 10:30 am

Annual Reports on Science and Law

Anticipating Science Impacts – Updates on the Last Year and the Next Decade

Martin A. Apple

The presentation discusses how science provokes discontinuity and reviews new analytical technologies, nano-technologies, quantum computing, knowledge management, genetic analyses, human clones, human organ manufacturing, robotic surgery, and molecular signal transduction. The progress of science will continue to provoke future revolutions, and this session opens a dialog on new ideas involving expert witnesses. It considers the adversarial process of seeking truth (law) versus the perpetually re-analytical approaches of science.

Annual Report on Science and Law

David Faigman

In this session, Professor Faigman will discuss the major trends of the past year in the area of science and the law. He will concentrate on the Daubert trilogy and will offer observations regarding recent developments in this area of the law. In particular, he will discuss specific subjects that have become controversial, including clinical medicine, engineering, forensic science, and police officer testimony. In addition, Professor Faigman will discuss a variety of other topics, including the changing nature of the Frye test, the realities of appellate review, and the role of court-appointed experts. Finally, he will briefly consider the uses of science in law outside the evidentiary context, with special consideration of *Kansas v. Crane*, the sexual predator case now before the United States Supreme Court.

Plenary Session, Thursday, 11:00 am – 12:30 pm

Annual Reports of Co-Sponsors

National Center for State Courts' Annual Report on Current and Proposed Programs and Projects in Science, Technology, and the Law

B. Michael Dann

The National Center for State Courts is the premier service and leadership provider to the nation's state courts. The Center also consults in several countries committed to extending the rule of law and building an independent judiciary.

The Center launched an online "Science, Technology and Law (ST&L) Resource Center" in July 2001. It is primarily intended for trial and appellate judges and their law clerks. It provides an easy-to-navigate and comprehensive collection of ST&L resources and learning opportunities, many of which were created with generalist judges in mind. Such a ST&L resource center for judges was called for in the 1993 Report of the Carnegie Commission on Science, Technology and Government, Science and Technology in

Judicial Decision Making: Creating Opportunities and Meeting Challenges. The Recourse Center can be found at <http://www.ncsc.dni.us/RESEARCH/ST&L/index.html>. Other teaching tools and services for courts will be added in the next several months. For example, an online and confidential "On-Call ST&L Mentors" feature will list qualified judges and S&T "neutrals" willing to engage in a short dialogue with an inquiring judge, to answer questions of a scientific, technical, or legal nature and to suggest additional reliable resources for the judge. Another program will educate judges on the many non-testimonial roles that a scientist or engineer can play in litigation and will provide a listing of organizations that maintain lists of experts willing to serve in court-appointed capacities.

Finally, the National Center, in collaboration with the Federal Judicial Center, the National Judicial College, and other partners in judicial education and from the sciences, will continue to design and provide an array of ST&L learning opportunities in new and traditional formats for judges and their research assistants.

American Academy of Forensic Sciences: Building the Bridge Between Forensic Science and the Law

Mary Fran Ernst

The American Academy of Forensic Sciences (AAFS), with support from the National Institute of Justice (NIJ), has created the Forensic Specialties Accreditation Board to assess, monitor, and recognize organizations and professional boards that certify individuals in the forensic science professions. Over the last 46 years, AAFS has published *The Journal of Forensic Sciences*, devoted to original investigations, scholarly reviews, and observations in forensic pathology, toxicology, psychiatry, criminalistics, questioned documents, engineering, and other forensically applied sciences. AAFS meetings bring together hundreds of leading professionals in the forensic field each year, both in Technical Working Group meetings and major annual conferences with commissioned papers on topics such as "Computer Forensics — Evidence Collection and Imaging Procedures that can Impact Examination and Admissibility of the Evidence in Court," "Ethical Problems Facing the Expert Witness," and "Responding to Discovery Issues and Court Orders Intended to Impact Forensic Science Laboratories." AAFS also publishes *The Academy News* for its membership, in which it updates them regarding current key topics such as "A DNA Tripwire? The John Doe Profile Warrant" and "Forensic Pathology Comes of Age: The U.S. Supreme Court Grants its Blessing." In the current year, AAFS is on the Planning Committee for the Summit Conference on the Future Directions for Scientific Evidence in Criminal Law, scheduled to occur in late 2002. It is also participating in several research projects for NIJ, the CASE Project for the American Association for the Advancement of Science, and developing guidelines for forensic science specialties and education. For AAFS's upcoming 54th annual Academy meeting in Atlanta during February 2002, the major theme will be "Certification, Accreditation, Education, Competence, and Personal Professional Integrity." Plenary sessions are scheduled to cover judicial perspectives, forensic specialty accreditation, and legal trends.

Law and Science Initiatives at the American Association for the Advancement of Science

Mark S. Frankel

The American Association for the Advancement of Science (AAAS) is sponsoring two initiatives at the nexus of science and law. One is the Court Appointed Scientific Experts (CASE) project, launched in late 2000. Developed under the aegis of the National Conference of Lawyers and Scientists, a joint committee of AAAS and the American Bar Association (ABA) Science and Technology Section, CASE will aid federal District Court judges in adjudicating complex litigation involving scientific and technological issues by recommending to them qualified scientific experts to serve as court appointed experts. Project staff will employ several mechanisms to identify potential experts, including contacting scientific societies and the

project's Recruitment and Screening Panel for candidates. Information on these candidates is then forwarded to the judge, who makes the selection. The role of the expert, i.e., whether to write a report, educate the judge on the issues, testify, or perform in some other capacity, will be up to the judge. The goals of the project are to encourage the use of court appointed experts by the judges when confronted with highly technical issues, to offer scientists and engineers an opportunity to perform a valuable public service, and to promote greater understanding between the legal and scientific communities. The second project is a collaboration with several other professional groups to convene a Summit Conference on Future Directions for Science in Criminal Law. The goal of the conference is to bring together scientists, attorneys, and judges to discuss the future of the forensic sciences in light of recent court decisions regarding the admissibility of scientific evidence and to begin a process of developing an agenda for future research. A planning committee has been organized into a steering committee and three subcommittees that will shape the agenda and target potential speakers. The Conference is tentatively scheduled for fall 2002.

Science, Technology, and Law Program: The National Academies

Anne-Marie Mazza

The National Academies established the Science, Technology, and Law Program in 1999 to monitor and explore the growing number of areas in which the processes of legal decisionmaking utilize or impinge on the work of scientists and engineers. The program's distinguished panel comprises 22 individuals and is co-chaired by Donald Kennedy, President-Emeritus of Stanford and current Editor-in-Chief of *Science*, and Richard A. Merrill, Daniel Caplin Professor of Law, University of Virginia Law School.

The Science, Technology, and Law Program is currently focusing its attention on two broad topics, (1) public access to research data and (2) judicial use and understanding of scientific and technical evidence. The panel held workshops on each of these topics. Reports of these workshops are scheduled for release this fall. Transcripts of the workshops are now available on the program's website: <http://www.nas.edu/stl>

American Bar Association

Thomas C. Smith

Founded in 1878, the American Bar Association (ABA) has over 400,000 voluntary members – principally judges and attorneys admitted to practice in the United States. It is important to note that membership is also available for “Associate Members,” who are not lawyers. Some of the Association's principal endeavors include (1) policy development, which forms the basis for the ABA to initiate activities to bring about changes to the justice system and the nation's laws, (2) continuing legal education programs, (3) legal publications, and (4) research and justice improvement activities. Much of the Association's activities are undertaken by its 23 sections, 5 divisions, and more than 80 commissions, standing and special committees, forums, and task forces. Of these, the activities of the Criminal Justice Section are most likely to be particularly relevant to persons who have an interest in “science and the law” as it pertains to the criminal justice system.

The ABA Criminal Justice Section has approximately 7,500 members. It is composed primarily of judges and lawyers representing all segments of the justice system (state and federal judges (both trial and appellate), state and federal prosecutors, state and federal public defenders, private defense attorneys, correctional officials, justice administrators, law enforcement personnel, and academics). It also includes approximately 220 associate members who are not lawyers. The Section's principal endeavors include (1) criminal justice policy and standards development, (2) legal publications, (3) continuing legal education, and (4) lobbying. During the year 2001-2002, the Section will undertake a variety of specific projects and activities pertaining to science and the law. These will include initiatives related to biological evidence and the conviction of innocent persons. These activities are to focus on the development of relevant standards

and an examination of whether systemic changes are needed to avoid such erroneous convictions. The Section has already developed Technically Assisted Physical Surveillance Standards (TAPS) - published in 1999. In 2001 it concluded its development of Electronic Surveillance Standards. It will be undertaking a continuing legal education program on cyberspace crimes (October 25-27, 2001 in Chicago, Illinois) and including segments related to science and the law in the Law Education Institute program (January 10-15, 2002 in Steamboat Springs, Colorado). On the drawing board is a publication pertaining to reports of scientific experts.

National Institute of Justice

Anjali R. Swienton

The National Institute of Justice (NIJ) is the research branch of the U.S. Department of Justice and a component of the Office of Justice Programs. The Institute Director is appointed by the President and confirmed by the Senate. Created by the Omnibus Crime Control and Safe Streets Act of 1968, NIJ's mandate is to support research, evaluation, and demonstration programs, development of technology, and both national and international information dissemination. The Institute actively solicits the views of criminal justice professionals and researchers in the continuing search for answers that are used to inform public policymaking in crime and justice.

NIJ is divided into three offices: the Office of Development and Communications (ODC) which develops and tests research-based programs, brings promising new practices to the attention of the field, and communicates findings and technological innovations through multiple methods; the Office of Research and Evaluation (ORE) which develops, conducts, directs, and supervises comprehensive research and evaluation activities ranging across a wide array of distinct topics including crime control and prevention, criminal justice and criminal behavior; and the Office of Science and Technology (OS&T) which directs and supervises technology research, development, and demonstrations to provide law enforcement and corrections agencies access to the best technologies available and provides technology assistance so that these agencies can enhance their capabilities to improve efficiency and effectiveness. NIJ has several funding opportunities each year. Funds are made available to the public through competitive open solicitations. NIJ's research and development portfolio has grown from \$70 million in 1994 to \$378 million in 2000.

In addition, the Investigative and Forensic Sciences Division of the Office of Science and Technology coordinates and sponsors professional conferences, such as the National Conference on Science and the Law, often in conjunction with other criminal justice and law enforcement agencies, to provide a venue for the training and education of scientists, attorneys, and judges in emerging areas of technology, science, and law. NIJ conducts focus groups comprised of members of state and local law enforcement, criminal justice, and forensic science communities to draft Guides containing best practices in specific areas of crime investigation. These Guides are published as a series. Guides, as well as a complete set of NIJ publications are available through NIJ's clearinghouse, The National Criminal Justice Reference Service (NCJRS) at 800-851-3420.

Concurrent Panels, Thursday, 2:00 pm – 5:00 pm

Science 101

Separating Science from “Junk Science” – Call for Empiricism and Rational Explanation

Bert Black

Mr. Black will address the fundamental question of what distinguishes scientific knowledge from

other kinds of knowledge. He will explore the “myth” of the scientific method and will outline characteristics that should be considered in assessing the validity of any scientific claim. He will focus on the bottom line requirement that a scientific expert provide an empirically supported rational explanation within the bounds of normal scientific discourse.

The 'Gatekeeper' Role: Judicial Management of Expert Evidence

Andre Davis

Judges are not scientists. And yet, 21st century judges are called upon regularly to adjudicate cases and controversies which are steeped in the methods, language, and knowledge of scientific and technical domains. Thus, it is imperative that today's judges take systematic steps to ensure their own good preparation for modern adjudicatory responsibilities. In no class of cases is this more true than in criminal cases.

Clearly, the education of judges in the basics of scientific methodologies is an important undertaking if the truth-seeking function is to work well and, ultimately, if the quality of justice dispensed by courts is to remain high. The Supreme Court's Daubert trilogy and the subsequent amendments to the Federal Rules of Evidence to conform the rules to the Supreme Court's jurisprudence, paved the way for federal and state trial judges to embrace enthusiastically their new roles as “gatekeepers” in the review of the soundness of expert testimony in scientific and technical fields. Judges are resorting to new techniques (and to settled techniques that have been available for decades) in the performance of their duties as the judicial role has evolved.

Differing Cultures of Practice: Science, Law, and the Judicial Gatekeeping Role

Shirley A. Dobbin, Sophia I. Gatowski

Given the discretion inherent in the gatekeeping role as prescribed under Daubert and its progeny, it is imperative that judges and other legal practitioners gain a basic understanding of the methods and philosophies of science. Faculty will discuss the differing cultures and underlying assumptions of the practice of science and the practice of law, and the implication of these differences for the judicial gatekeeping role and presentation of scientific evidence in court. The session will focus on the concepts of certainty and proof, reliability, falsifiability, error rate, and probability within both the scientific and legal contexts.

Trajectory of the Forensic Sciences

Victor W. Weedn

The use of objective scientific evidence is increasing and is now an essential element in the prosecution of perhaps most crimes. Drug chemistry in drug cases, firearms examinations in cases of gun violence, trace evidence in unwitnessed crimes, questioned documents in white collar crimes, DNA in rape cases, and forensic pathology and toxicology in homicide cases. Criminalistics practice began as a tool for police investigators. This is most evident in the first widespread application—fingerprints, which are still obtained primarily outside of the crime lab. Small numbers of crime labs were established at the turn of the century, after the Lindbergh baby case, post World War II, and in the Law Enforcement Assistance Administration (LEAA) years. The humble beginnings may have been little more than a microscope and a closet. More sophisticated scientific techniques began to be applied, with dedicated practitioners. The establishment of the American Academy of Forensic Science in 1950 marked the beginning of the professionalization of the community. The National Association of Medical Examiners was formed in 1966 and the American Society of Crime Laboratory Directors in 1972. This was followed by the development of certification boards, largely in the 1970s. Although proficiency testing began in the late 1960s and early

1970s, defense use of these results led to a de facto moratorium until the advent of DNA testing in the late 1980s. DNA has had a sweeping effect on the laboratory quality assurance practices within forensics for a variety of reasons, including attitudinal, judicial scrutiny, accreditation practices, and regulatory. Moreover, laboratories are becoming better funded. Public expectations are rising. No longer are forensic analyses merely confirmatory; they are now definitive and increasingly investigatory in nature. As their power grows, they are becoming increasingly autonomous and independent and they have begun to encroach upon traditional police detective turf. They face a host of concerns including public cynicism, government bureaucracy, second-guessing by those who make use of them, and distancing from the very questions they are trying to answer. A higher level of science and scientific rigor is being applied, and yet this community addresses different questions with different specimens, and faces different issues than other scientists. Although society has never been better served, it is unclear if society will be fully supportive of their progress.

Law 101

Epistemology of Science and the Application of Scientific Principles

Jose R. Almirall

The presentation will summarize the theory and application of scientific principles in the administration of justice today. Scientists should be aware of the increasing demands by the courts to demonstrate that both the theory and application of a given technology is sound. The burden to articulate and defend these assurances belongs to the forensic scientist. This presentation will describe the framework scientists build to support our opinions, including the use of the collective knowledge base to develop and validate methodology, the constant and incremental gains to that knowledge base that continually improve the value of evidence, and the peer review systems that allow for the dissemination of good science. Crime laboratories have adopted a number of specific institutional tools in order to improve the quality of scientific evidence. The standardization of methodology aims to address uniformity in results and opinions, accreditation of facilities requires an organizational investment in quality systems, and certification of individual scientists, including the use of proficiency testing, promotes the continuous development of that scientist. All these tools enhance the quality of the science in the courtroom. The presentation will also cover the tensions at the interface between science and the law and how forensic scientists can deal with the challenges facing us today and in the future.

Preparation and Trial Use of Scientific Evidence

George Woody Clarke

The use and introduction at trial of forensic evidence has dramatically impacted the prosecution and trial of defendants charged with violent crimes in the United States and worldwide. Successful and persuasive presentation to courts and juries of forensic evidence necessitates careful preparation on the part of both expert and attorney. This presentation will address approaches and suggestions to facilitate preparation for trial testimony. In addition, methods for simple and effective communication of forensic analysis results will be discussed.

Function of Judge and Jury and Burden of Proof

Linda K. Lager

The different functions of judge and jury as they relate to expert testimony may not be well understood by scientific and other expert witnesses. Typically, a judge rules on the qualifications of experts

and the admissibility of evidence. The jury determines the weight to be accorded to the evidence and measures it according to the applicable standard of proof provided in the judge's instructions. This presentation will provide a judge's perspective of these roles, discuss how the function of the judge and jury with respect to expert testimony may be explicitly or implicitly affected by the type of case (civil or criminal) and provide an explanation of the standards or burdens of proof employed by the law? beyond a reasonable doubt, clear and convincing evidence, and a preponderance of the evidence? and why they are not logically comparable to numerical or statistical standards employed in science.

Law of Expert Witnesses

Michael J. Saks

This presentation will briefly summarize and explain the law of expert witnesses: What is asked of and allowed from expert witnesses that is different from ordinary fact witnesses. Why expert witnesses are required to climb a higher threshold to gain admission. Different tests of admissibility across time and jurisdiction (especially the pre-Frye marketplace test, the Frye test, and the Daubert test, and how these are similar to and different from each other). The gloss on Daubert provided by *Joiner v. G.E.* (no more ipse dixit) and *Kumho Tire v. Carmichael* (forensic scientists no longer can escape scrutiny under Daubert by claiming to be non-scientists; global analysis is out and task-at-hand analysis is in). New additions to Federal Rule of Evidence 702. The nature of Daubert hearings. What is asked of proffered scientific experts whose expertise is under scrutiny? be able to explain the underlying theory, the data testing that theory, the relevant literature, how the theory is applied in casework, procedures designed to insure accuracy, error rates inherent in the theory and associated with applications of the theory to practice. Post-Daubert, judges in criminal cases have gradually grown more demanding than they previously had been, though they still lean toward admitting government experts without requiring much. The level of scrutiny may increase, however, as the scientific literacy of lawyers and judges increases, and as judicial and societal concern about erroneous convictions of innocent people grows, along with the recognition of the role of forensic scientists as the single largest cause of erroneous convictions.

Plenary Session, Thursday, 5:15 pm – 6:15 pm

Forensic Fraud

Forensic Fraud: Who's Taking the Fall?

Sheri H. Mecklenburg, Michael P. Monahan

What is forensic fraud? The speakers will discuss the meaning of this evolving idea from the scientists' perspective and from lawyers' perspective. How do these standards differ, and should they?

The speakers also will address who should share the culpability (the scientist, the prosecutor, or the defense attorney?) and on whose shoulders blame falls? Years after the conviction, how does 20/20 hindsight affect the perception of fault? Does a wrongful conviction equal innocence, and does that translate into forensic fraud? In retrospect, how do we judge the science and the scientist at the time of the conviction? How do science and law differ in their views in judging the past? Will DNA evidence, the perceived panacea today, become the potential problem tomorrow?

In wrongful convictions, when is forensic fraud actually the important factor? Why are courts willing to excuse mistaken witnesses, and even self-serving testimony, but never to forgive the scientist? How does hindsight skew our perception of who's to blame?

Plenary Session, Friday, 8:00 am – 9:30 am

Court Appointed Experts and Advisors

Federal Courts' Reluctant Embrace of Appointed Experts

Joe S. Cecil

Judges are naturally cautious about appointing an expert who might intrude on the adversarial process. Examination of court appointment of experts in federal civil cases suggests this will remain a rare practice, suitable for instances in which the traditional adversarial process has failed to permit an informed assessment of the facts. Practical problems also complicate the appointment of experts. Timely appointment is difficult since judges may be unaware of the need for such an expert until the eve of trial. Finding a qualified expert who is neutral with regard to the disputed issue also may be difficult. In such instances, an expert may still be appointed to explain basic issues and summarize various points of view without addressing the ultimate disputed issue. Compensation of appointed experts presents problems where the parties must pay the cost. Finally, safeguards must be adopted to avoid improper ex parte communication.

Registry of Independent Scientific and Technical Advisors: A Judicial and ADR Resource

John Martin Conley, Corinne Anderson Hought

This presentation will describe an innovative program of the Duke Private Adjudication Center, designed to help improve the use of science in legal decisionmaking. The Registry of Independent Scientific and Technical Advisors is a service through which courts, government agencies, ADR practitioners, and parties may find highly qualified, nonpartisan experts to advise them in particular cases, when they feel that such advice may be helpful in resolving disputes and making decisions on a well-informed, principled basis. The presentation will discuss the background of the Registry, the criteria for selection of Registrants, and the services available through the Registry. Particular emphasis will be given to the variety of cases and issues in which the Registry is currently providing services and the different roles independent experts may serve.

Being A Court-Appointed Expert

Rebecca Klemm

Being a court-appointed expert will likely require that the expert lead their engagement more than in cases where they are called to provide opinion in any other format. Since the use of such experts has been rare, some of the parties may have little experience with appropriate protocols for such an expert, including the court appointing the expert. Depending on the nature of the appointment and how the expert were selected, he or she may have no “client” other than the court itself, who will not be likely to interact with the expert as if he or she had been retained by counsel for the plaintiff or defendant. The expert, thus, may need to manage their engagement more than usually required when retained by counsel of either the plaintiff or defendant. Although lawyers may be trained in manners of appropriate professional behavior during an ongoing legal matter, few scientists are so trained. The expert must be prepared to lead the discussions about the frequency and method of appropriate communication if they are not discussed openly with the parties before embarking on the work. This, too, is not a traditional role of most scientists, and, thus, might not be deemed necessary by the expert.

The expert should also be prepared to lead the discussion of the style and delivery of a report and testimony delivered as direct or cross examination. Oral testimony could be provided as traditional direct examination via answers to questions posed by the court/specified parties or using a lecture format by the

expert as if answering the one question, “What did you do and what did you find?” The discussion should also involve any examination questions that should be given to the expert ahead of delivery of the testimony; and, if this is necessary, provide an established amount of lead time. The expert will be likely to be required to prepare for oral testimony without client interaction.

The speaker will annotate the presentation with actual situations encountered as a court-appointed expert.

Court Experts

Ronald S. Reinstein

Courts regularly appoint Special Masters to assist the court in matters such as the valuation of businesses and professional practices and also to monitor discovery in complex civil litigation. They also regularly appoint psychologists or psychiatrists to do diagnostic evaluations or risk assessments to assist the court in criminal sentencing's and to conduct custody evaluations in domestic relations disputes. Over the last several years especially, courts have appointed technical advisors on computer software and database issues. However, it is rare for a court to appoint its own expert or technical advisor for scientific issues even though most judges have no scientific background, as this is an area usually reserved for the parties and their counsel.

Some judges, though, have successfully used science experts or advisors to provide what is hoped to be unbiased information to the court, counsel, and even the jury. The process for appointment of a court expert will be discussed, as well as possible pitfalls such as the issue of the court communicating with the expert on an ex parte basis.

Plenary Session, Friday, 10:00 am – 11:30 am

Law Enforcement Personnel Testifying as Experts

Police as Expert Witnesses

Philip J. Cline

The following are the criteria that are considered when law enforcement personnel testify as expert witnesses in court cases. Qualifications and experience Data or other information considered prior to forming opinions Publications authored by the expert witness List of cases in which this expert has been used

Statement of opinions and their basis

Challenges Facing Law Enforcement Personnel Testifying as Experts

Carol Henderson

As a greater number of law enforcement personnel begin taking the stand as expert witnesses they must be aware of the significant challenges facing them in this new role. These challenges include: Keeping current with the latest developments in the law affecting experts; Increasing investigation of experts' qualifications by attorneys; The proliferation of databases of expert witness transcripts; Communicating effectively with jurors; Judicial skepticism of expert witnesses; Certification and accreditation; and New technology and innovations in courtroom presentation of expert testimony.

The presentation addresses each of these challenges and offers strategies for meeting these challenges.

Law Enforcement Personnel Testifying as Experts

Bruce M. Lyons

Because law enforcement experts who testify in scientific or technical disciplines are subject to the same tests as other similar experts, the focus of testimony is on law enforcement personnel whose opinions are admitted based on their experience. The first question is reliability, the training and experience of the expert as well as the reliability of protocols in his/her area of expertise. The second question is relevance, the true purpose for admission of the opinion testimony.

The impartiality of a paid expert is always a concern. That concern is heightened when the expert is a sworn law enforcement officer. When such officers are allowed to testify as experts as to the practices and behavior of criminals, there is substantial potential for unwarranted prejudice to the defendant. Juries may give undue credence to an officer's testimony. Broad profiles of criminal behavior may be offered that are only marginally relevant and may impermissibly prejudice the jury against the defendant by raising spurious implications as to his knowledge or intent. Such testimony may be excluded because it is more prejudicial than probative. By the implications raised, it may also violate the rule that prohibits experts from commenting on the mental state of the defendant. The task of defense counsel is to insist on relevance. Only narrowly tailored explanation of criminal *modus operandi*, related to actual issues at trial, is admitted either to prove facts at issue or to assist the jury to understand evidence that might otherwise seem innocuous.

Recent cases will demonstrate the subtle distinctions courts have developed to guard against the admission of law enforcement testimony that the courts consider overly broad.

Plenary Session, Friday, 11:30 am – 1:30 pm

Luncheon and Poster Session

Steganography: Survey of the Technology and Forensic Applications

Charles Boncelet, Lisa Marvel

Presenters survey steganography, literally Greek for "covered writing," with particular attention paid to forensics applications. The discussion compares and contrasts cryptography with "secret writing" and argues that high performance systems will use both. Presenters give a brief history of steganography, give examples of how steganography might be used (e.g., to hide files on a computer or to provide plausible deniability), and discuss some strategies for law enforcement.

Perils of Item Focus Myopia in Forensic Investigations

Peter R. De Forest

Physical evidence occurs in a context. This context is unique to a case. An understanding of this context may be critical to both an effective and accurate case solution and a fair and impartial adjudication. Despite recent technological advances in forensic science, especially with respect to biological evidence, and a justifiable feeling of accomplishment, all is not well.

Several adverse trends can be discerned. Increasingly, the context of the physical evidence is being ignored. The potential of what can be reliably learned from consideration of physical evidence has become the primary "victim." Formulation of scientific questions to be addressed by an examination of the physical evidence is passing from broadly trained forensic scientists to nonscientist investigators. Inescapably, the scope becomes narrowed and scientists are considered technicians. The questions asked of the evidence become scientifically naive, trivial, and often irrelevant. Both front and back end case assessment suffers as

does integration, and interpretation of the evidence. Resources may not be adequate to allow experienced forensic scientists to respond to crime scenes. Required scientific expertise, necessary for overall interpretation and reconstruction of crime data, may not be available within the laboratory system. Too often, the resulting vacuum is being filled by (perhaps well-meaning, but) unqualified expert witnesses who do not understand the limitations of science and scientific opinion testimony. Consequently, the results ultimately obtained in the laboratory may be technologically sound, but contribute little of value to the case solution. The dangers include unsolved cases on the one hand and possible miscarriages of justice on the other. The presentation uses case examples will be used to illustrate the major thesis.

Threat Appraisal in Self-Defense or Duress: Application of Empirical Findings Involving Battered Women

Mary Ann Dutton

A central element in both criminal and civil cases involving self-defense or coercion is the issue of reasonable perception of danger. Whether a specific jurisdiction relies on a subjective or an objective standard, evidence regarding an individual's level and nature of fear is relevant. Social science expert testimony can provide a foundation for assisting the factfinder in determining this issue. This presentation examines three models for understanding threat appraisal in these types of cases, based on coping theory (Lazarus and Folkman, 1984), domestic violence risk prediction literature (Campbell, 1995; Kropp and Hart, 2000), and "battered woman syndrome" (Walker, 1984). Implications of the recent "risk as feelings" hypothesis (Loewenstein, Weber, Hsee, and Welch, 2001) will also be explored.

Specifically, this presentation empirically examines threat appraisal (e.g., perception of specific verbal statement as threat to kill, perception of specific motor behavior as attempt to harm) and resource appraisal (e.g., timely access to resources to protect from perceived threat) as cognitive components of risk perception. The relevance of the social science literature pertaining to violence risk assessment will be discussed as it relates to cognitive threat appraisal. Social learning theory will be presented to guide an understanding of factors that assist in the discrimination of dangerous from benign interpersonal interactions (e.g., immediate threat behavior, prior learning history, observational learning, psychological state, physical condition, prior knowledge of person engaging in threat behavior). Finally, consideration of feelings as determinants of behavior – both in terms of anticipatory emotions, affect-as-information, and emotional reactions to stimuli that are not cognitively mediated – will be discussed. Application of this social science literature concerning threat appraisal will be discussed with reference to legal cases involving self-defense and duress. Scientific evidence addressing the above theories will be discussed in terms of a potential Daubert or Frye hearing. Case material from clinical experience will also be offered as it might be relevant under the Kumho decision. Illustrations using actual case material from domestic homicide cases will be presented.

The Science? of Psychology: Effects of Daubert v. Merrell Dow Pharmaceuticals on the Admissibility of Psychological Expert Testimony

Jennifer Groscup

The Supreme Court's decision in Daubert v. Merrell Dow Pharmaceuticals established a new set of criteria to be applied to decisions governing the admissibility of scientific evidence. Many predictions were made about the effect this change would have on the admissibility of expert testimony in the field of psychology. This study was conducted to assess the effects of this landmark decision on the admissibility of psychological expert testimony in federal and state appellate courts. Over 700 appellate court opinions concerning the admissibility of psychological experts were coded for content on over 100 variables related to admissibility of expert testimony. These cases spanned a period of more than five years before and five years

after Daubert. Analysis revealed that significant differences in the admissibility of certain types of psychological experts did occur. For example, testimony with a mental health basis was more likely to be admitted than testimony with a scientific basis. Clinical psychologists were admitted at higher rates than experimental psychologists. While testimony concerning topics such as child sexual abuse and syndromes was likely to be admitted at the appellate level, testimony concerning the reliability of eyewitnesses was likely to be excluded at the appellate level. Differences in courts' use of certain judgment criteria were also observed across types of psychological testimony. Details of appellate court use and application of Frye, Daubert, the Daubert criteria, and the Federal Rules of Evidence will be presented as they relate to different types of testimony given by expert psychologists.

Forensic Science on Trial: Judicial, Juror, and Expert Witness Perceptions of Science in the Courtroom

Charles P. Illsley

Forensic science has been under attack in courtrooms throughout this country. The attacks are focused on two fronts. Old technologies are scrutinized under *Daubert* standards. New technologies are criticized for lack of reliability and validation.

Surveys of three groups of participants involved in the scientific presentation of forensic evidence in court reveal startling differences in how evidence is perceived. In three separate inquiries, judges, jurors, and expert witnesses were presented with identical questions about witness credibility, scientific reliability, and the mechanics of the expert witness presentation.

A total of 1,551 jurors in one state, 300 judges in 10 states, and 500 forensic experts from throughout the country were asked their preferences about the expert's qualifications, employment, membership in professional associations, level of education, experience, training, and personal appearance. These groups were also polled about their preferences for the witness's actual presentation in court, including the use of visual aids. The surveys generated over 1,000 written comments about how the expert can communicate effectively on the witness stand. The judges cited specific obstacles to jurors' understanding of the scientific testimony. Perhaps the most revealing aspect of the three surveys is the stark contrast between the judges and jurors who hear expert testimony, and the expert witnesses who present it. In some areas, experts appear to have misjudged judicial and juror perceptions about the validity of their science and the effectiveness of their testimony.

NIJ's publication on this project, it is believed, will be the first of its kind, comparing the perceptions of all three groups involving the same instrument. The presentation is supported by a review of the literature dating back three decades. Short video clips from actual cases and slides of various court exhibits are used to illustrate perceptions identified in the project.

Juror Evaluations of Expert Psychological Dangerousness Testimony in the Confusing World of Daubert: Can Jurors Tell the Difference Between Good Expert Testimony and Bad?

Daniel A. Krauss, Dae Ho Lee

Even with the Daubert, Joiner, and Kumho decisions, many state and federal courts may apply Daubert and its progeny in a manner that assumes that jurors are capable, with the aid of adversary procedures (i.e., cross-examination and competing experts), of differentiating less accurate clinical opinion expert testimony (based solely on a clinician's years of experience with the field) from expert testimony based on more sound scientific footing, and appropriately weighing these two types of testimony in their decisions. Literature from both persuasion and jury decisionmaking research, however, suggests that this assumption is suspect. Using a simulated capital sentencing hearing based on Texas law, a series of experiments investigated whether mock jurors are more influenced by clinical opinion expert testimony or actuarial expert testimony (based on a standardized risk assessment instrument, the Violence Risk

Assessment Guide (VRAG)). The effectiveness of different types of adversary procedures (cross-examination and a competing expert) in modifying the influence of expert testimony was also investigated. Results suggest that jurors are more influenced by clinical opinion expert testimony than by actuarial expert testimony, and this preference for clinical opinion expert testimony remains even after the presentation of adversary procedures and deliberations. Limited empirical evidence was found for the notion that various types of adversary procedures will have a differential impact on the influence of expert testimony on juror decisions. The legal and policy implications of these findings are discussed.

Bayesian Assessment of Presentation Formats for Trace Evidence with a Quantifiable Random Match Probability

Dale A. Nance

Since the early 1970s, academics have debated the wisdom of an explicit use of statistical information concerning the probability of a coincidental match in the presentation of forensic match evidence at trial. Critics have pointed to the dangers of such use of numbers, arguing that jurors would misunderstand the numbers and exaggerate their importance in the case. Others have maintained that jurors inability to understand scientific evidence will lead them to discount excessively the significance of a match. Meanwhile, courts have developed a variety of rules about the communication of statistical information determining the significance of a match.

The present empirical study employed a large number of people called for jury service in Kane County, Illinois, obtaining responses to a hypothetical rape case in which DNA match evidence is presented. The case was presented in written form, and the respondents were asked to assess the probability of guilt and their willingness to convict. Several presentation formats, each with some judicial approval, were studied.

The collected data support one conclusion reached in previous empirical research that employed less jury-representative subjects: Rather than ignoring the non-scientific evidence in the case, these jurors tend to undervalue the scientific evidence, measured against a Bayesian norm. More importantly, the data indicate that a careful use of Bayesian methods in the courtroom can assist the jury in reaching more accurate verdicts, a conclusion not reached in previous studies. Further, and contrary to previous predictions, suppressing information about the relatively large size of lab error rates when presenting information about a small random match probability decreases the respondents' assessments of the probability of guilt and their rate of conviction.

Are Court Appointed Experts the Solution to the Problems of the Presentation of Scientific Evidence?

Alan J. Tompkins, Anthony Champagne, Daniel Shuman

Court-appointed experts have long been touted as the solution to many of the problems associated with the presentation of scientific evidence in the courtroom. Recently, Justice Stephen Breyer, the American Association for the Advancement of Science, and the American Bar Association have advanced proposals for using court-appointed experts to change the way in which scientific and technical issues are addressed in the courts. Notwithstanding these proposals, there has been little examination of the current uses of court-appointed experts in the courts, in part because retained experts dominate the American judicial landscape. Unless the important players in the judicial system find court-appointment of experts practicable, the calls for court-appointment will remain unheeded. Although there are reports of the use of court-appointed experts in isolated individual cases, these cases are unique making it difficult to generalize more broadly from the experiences of the participants in these cases. One area of law in which court-appointed experts are common is family law, permitting a systemic examination of the use of court-appointed experts. Do judges, lawyers, and experts who work in the family law courts find that court-appointed experts are an effective alternative to retained experts, for example, do they find that the testimony of court-appointed experts is more objective; do

they find that the use of court-appointed experts leads to more accurate decisions; are lawyers willing to relinquish control over the selection and presentation of privately retained experts? In this paper, the authors discuss the observations of judges, lawyers, and experts in Nebraska and Texas about their experiences with appointed and retained experts in family law cases. These observations provide important insights on the use of court-appointed experts and the hurdles that will have to be overcome before the judicial system embraces the use of court-appointed experts.

Forensic Fire Science – Fire Investigation’s Future and What the Courts Should Expect

Richard E. Tontarski, Jr.

This presentation’s objectives are: (1) To review how fire origin and cause is currently presented in court, (2) To illustrate the features being designed into the ATF Fire Research Center and how they will promote the application of fire science in fire scene investigations, and (3) To illustrate how controlled burn testing and fire modeling will impact courtroom understanding and expectations.

The Bureau of Alcohol, Tobacco and Firearms (ATF) is building a Fire Research Center (FRC) that will increase the use of fire science in fire origin and cause determinations. Testing and training will be conducted for ATF certified fire investigators (CFIs) and other public sector fire officials. The facility will provide a controlled environment where fire investigation theories can be investigated and fire propagation scenarios can be reconstructed on a large scale. The FRC will also have the ability to conduct demonstrations of fire phenomena for training fire investigators and will do research in fire behavior as it relates to origin and cause determinations.

The increased emphasis on using proper scientific method, and its implications for presenting evidence in court, extend beyond DNA and impact all forensic disciplines. Fire scene investigation is no exception. Significant strides have been made by NFPA, IAAI, and other professional organizations to establish fire investigation standards and dispel myths about origin and cause. Forensic fire science extends this by applying principles of theoretical fire science to practical, real-world scenarios. It gives people the opportunity to build on the investigative improvements to date, develop an even better understanding of fire origin and spread, and illustrate findings for the investigative and legal communities.

This presentation will illustrate the use of engineering with examples based fire modeling and fire reconstruction testing. Properly instrumented, the tests will provide a scientifically valid reconstruction of the vents involved in the questioned fire incident. The method can illustrate fire and smoke movement through structures, offer identification and plotting of the spread of toxic gases, and show the rate of rise of temperatures in an area of interest. These will be compared to “interpretations” of findings and the use of animation to illustrate fire growth and development.

Proposals for how this new technology will impact the court’s expectations, what the courts will require from experts, and what should be admissible will be discussed.

Plenary Session, Friday, 1:30 pm – 3:00 pm

Eyewitness Evidence

Getting the Lawyers to Listen

James M. Doyle

The presentation traces the obstacles that have impeded the integration of social science on eyewitness testimony into the legal procedures and points to successful adjustments in reform strategy.

Improving Juror Decisionmaking with Scientific Research on Eyewitness Memory

Ronald P. Fisher

Recently, a panel of researchers, police officers, prosecutors and defense attorneys produced a set of guidelines on how to elicit information from eyewitnesses (NIJ Guide). One of the goals was to assist decision-makers (e.g., judges, police, jurors) to make better decisions about the quality of eyewitness evidence. In this presentation, a courtroom-simulation study will be described that examines jurors' ability to distinguish between eyewitnesses who make correct versus incorrect photo-lineup identifications of criminals. Can jurors, who are typically poor at this task, make better decisions when they are informed about the principles underlying the NIJ Guide than when left to their own devices? If so, what is the best method to inform jurors of these principles? The results of this specific experiment will be extended with some general observations about the intersection between behavioral science and the law.

Science and Eyewitness Evidence, Challenge for Law Enforcement

Mark Larson

Unlike other forensic sciences, the science surrounding eyewitness evidence is practiced in the field by over 600,000 police officers across the country. This presents a strategic challenge to creating change, particularly when no consensus exists among police that there is a problem that needs to be solved. Although the publication of NIJ's *Guide* was a good starting point, affecting real and lasting change in police practice will require more. The goal should be to develop a strategic plan, capitalizing on any momentum created by the NIJ's effort, to train and work alongside officers and departments across the country, as well as others in the criminal justice system.

Eyewitness Identification: Scientific Research and Application

Gary L. Wells

Case studies show that mistaken eyewitness identification is the primary cause of proven cases of the conviction of the innocent. A primary process by which these mistaken identifications occur is through the relative-judgment process. Eyewitness identification research has revealed ways to make the lineup more reliable as a means of obtaining evidence. The need for double-blind testing and sequential procedures, rather than the usual methods for conducting lineups, is described. Attempts to change the way that lineups are conducted has met with some success, but there remain obstacles to the full implementation of these improvements to the collection of eyewitness identification evidence.

Plenary Session, Friday, 3:30 pm – 5:00 pm

Call for Papers Presentations

Medical Records as Legal Evidence of Domestic Violence

V. Pualani Enos, Nancy Issac

The presenters describe the methodology and results of research examining the potential usefulness of medical documentation as evidence of domestic violence in a variety of legal proceedings. The presentation will also discuss the project's multidisciplinary researcher/practitioner working group's participation in data analysis and recommendations for future research and changes in practice.

Kumho Tire and the "Task at Hand"

D. Michael Risinger

Kumho Tire v. Carmichael, stands for two principles. The first is that the judge's gate-keeping responsibility to insure appropriate minimum threshold reliability pursuant to Federal Rule of Evidence 702 applies to all proffered expert testimony, not just to the explicit products of "science." The second is that this judgment must be made concerning the "task at hand," instead of globally in regard to the average dependability of a broadly defined area of expertise, which might be dependable in other contexts, but not in regard to the particular "task at hand." The first principle is currently more widely perceived, but the second is no less central to the decision, and is potentially more important in the actual determination of cases.

The centrality of this task-specific approach to reliability was repeatedly made clear by the Court in the Kumho Tire opinion itself, perhaps most succinctly when it said, "contrary to respondent's suggestion, the specific issue before the court was not the reasonableness in general of a tire expert's use of a visual and tactile inspection ... Rather, it was the reasonableness of using such an approach, along with [the expert's] particular method of analyzing the data thereby obtained, to draw a conclusion regarding the particular matter to which the expert testimony was directly relevant ... The relevant issue was whether the expert could reliably determine the cause of this tire's separation (526 U.S. at 147, emphasis supplied)." In other words, to borrow an image, reliability cannot be judged globally "as drafted," but must be judged only specifically "as applied."

The implications of Kumho Tire are just beginning to be felt. Under Daubert, previous determinations of reliability tended to examine the reliability of challenged expertise more globally, using very general data about reliability to respond to challenges. As a result of Kumho Tire, such data become of peripheral relevance. Kumho Tire changes the way questions must be framed, the kind of data that addresses the questions, and the way in which studies aimed at providing validation must be designed and carried out. In addition, it renders central certain issues that flew under the radar of the system before. Under Daubert, reliability determinations tended to be made assuming optimum conditions. Under Kumho Tire, the actual conditions of the individual exercise of expertise become relevant, putting in play such important factors as the failure to control for suggestion, expectation, and other precursors of observer effects that may undermine the reliability of the individual determination.

Recent Defense Challenges to Forensic DNA Evidence

William C. Thompson

Although DNA evidence is a powerful tool for proving identity, it can be challenged in the courtroom on many grounds. This presentation will describe various ways that criminal defendants have attacked DNA evidence, using a series of recent cases as illustrations. Lessons will be drawn from these cases about the strengths and weaknesses of current laboratory and legal procedures for dealing with DNA evidence.

Plenary Session, Saturday, 9:00 am – 4:30 pm

Digital Evidence: Virtual Reality in the Real World Courtroom

Digital Evidence: Virtual Reality in the Real World Courtroom

Susan M. Ballou, Charles Boncelet, Douglas Elrick, Judith D. Ford, Anthony A. Joseph, Lisa M. Marvel, Richard Murray, Robert S. Vance, Jr., Wayne Williams, Terry Willis

During this session, all attendees will be provided with the unique opportunity to witness the re-

enactment of an actual trial. Although some attendees may have had courtroom experience, this session offers the chance to listen to different directions of questioning by attorneys skilled in the area of digital evidence. As with a trial, the audience will listen to the judge's instructions followed by opening arguments by both the prosecution and the defense attorneys. Restricting this presentation to one day allows the organizers the luxury of whittling down the breadth of the trial to the most compelling facts.

The case selected for the one-day session is high in intrigue, lust, blackmail and murder. Although these aspects are the critical elements required for a good book or a blockbuster movie, the case will actually dwell upon the latest tools used by criminals today, electronic devices. The victim was a chat room junkie that became too involved with one of his "admirers" on line. The extent of our victim's involvement with his on-line "buddies" will be extracted from the noteworthy list of witnesses scheduled to testify. But will the information gathered from the chat logs provide the support for the motive? Expert witnesses will demonstrate where other circumstantial evidence exists in the web of electronic files that adds to the investigation. There will be ample time for the defense to question and interject their own interpretation of the events along with arguments to convince the judge to rule the evidence inadmissible. The audience will have time to present their own questions and concerns regarding the line of questioning and the rulings. After the verdict, the audience will take part in an interactive discussion on the facts of the trial and the legal concerns regarding digital evidence. Law enforcement personnel have expertise in digital evidence and have the primary responsibility for the development of probable cause, which leads to the search and seizure of evidence. The question of credibility arises in the analysis of the evidence in the laboratory and presentation of the evidence in trial.